Former River City Auto

Salmon, Idaho

Draft Voluntary Remediation Work Plan

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Executive Summary

The River City Auto is a former, automobile service station and retail gasoline dispensing and storage facility located in central Idaho. Retail gasoline dispensing operations discontinued in approximately 1994 and during underground storage tank (UST) removal activities petroleum product was observed leaking from one of the USTs, resulting in subsurface contamination.

Subsequent subsurface assessment activities indicated the presence of petroleum contamination in soil and/or ground water samples collected at the former River City Auto facility and in ground water samples collected near the City Hall and Public Library facilities. Petroleum contamination was also present in surface water samples collected from the nearby Salmon River.

Cleanup of free-phase petroleum floating on the ground water has previously been addressed, however petroleum contamination still remains in soil and ground water located beneath the former facility and in ground water located between the former facility and the Salmon River.

The Salmon River Redevelopment Agency (SRDA) currently has ownership of the former River City Auto facility. In December 2005 SRDA applied for and received a Brownfields Cleanup Grant from the United States Environmental Protection Agency (EPA) to assist in cleanup of the facility. SRDA has also applied for and been accepted into the Idaho Department of Environmental Quality (IDEQ) Voluntary Cleanup Program (VCP).

This draft Voluntary Remediation Work Plan (VRWP) is being prepared on behalf of the SRDA to address soil and ground water remediation activities to be performed at the former River City Auto facility located at 205 Main Street in Salmon, Idaho.

Submittal of this draft VRMP addresses the requirements of the VCP according to IDAPA 58.01.18 “Idaho Land Remediation Act Rules”. For draft VRMP discussion purposes, the former River City Auto facility will herein be referred to as the “site.”

A 30-day public comment period will be held on this draft VRWP (including the Analysis of Brownfields Cleanup Alternatives (ABCA)) with published notices in daily Idaho newspapers, Salmon’s Recorder Herald, and IDEQ’s website. Paper copies of the draft VRWP will be available for review at the IDEQ State Office and Salmon City Hall. Written comments received during this period will be considered by IDEQ before finalizing the VRWP. The final VRWP, which includes how comments were addressed, will be available at both the IDEQ State Office and Salmon City Hall.

1.0 Introduction

The site was formerly operated as a retail automobile gasoline storage and dispensing facility from approximately 1969 through 1994. Private owners Proksch and Moodie reportedly leased the site to Chevron from approximately 1969 through 1982. Mike Cleeves reportedly purchased the site in 1982 and operated the site as a retail gasoline service station from 1982 through 1994.

Retail gasoline dispensing operations stopped in approximately 1994, however the facility was operated sporadically for the purpose of retail automotive sales and repair until approximately 2005.

Redevelopment of this site is intended for commercial use. The use is compatible with the use(s) of surrounding properties. The SRDA and the Library Board Association are proposing to construct a new on-site public library facility.

2.0 Site and Surrounding Area

The site is located in the southwest quarter of the northeast quarter of the southeast quarter of Section 6, Township 21 North, Range 22 East in Salmon (Lemhi County), Idaho (Figure 1). The site is further described as Parcel #RPA0001030001AA located in Lot 5, Block 2 of Spahn's Subdivision and Lots 1 and 2 of the Salmon City Townsite.

The formerly developed site is approximately 10,000 square feet in size and located on the southwest corner of the intersection of Main Street and Terrace Street within the city limits of Salmon, Idaho (Figure 2).

The Salmon River is the nearest surface water source and is located approximately 330 feet from the site. Ground water beneath the site flows (northwest) toward the Salmon River and is assumed to be gaining in the vicinity of the site. Elevation of the site is approximately 3,940 feet above mean sea

level. The topography is relatively flat, however slopes gently toward the Salmon River.

A search of the Idaho Department of Water Resources (IDWR) domestic well database identified 31 wells within a ½-mile radius of the site. A list of the domestic wells is provided in Appendix 1. Of the 31 domestic wells listed in the IDWR database, only eleven domestic wells are reportedly active and located within a ½-mile radius of the site, as illustrated on Figure 3. No domestic wells are located on-site or between the site and the Salmon River. One injection well was noted east of the City Hall building and receives discharge water the buildings heating and air-conditioning system.

3.0 Remediation Goal and Objective

The overall goal of this Brownfields VCP remediation effort is to ensure that contamination does not threaten public health and the environment during and after redevelopment of the site. The pathways which guide the remediation and determine the cleanup criteria are primarily based on protection of ground water for drinking water purposes and protection of surface water at the Salmon River. Details regarding these specific cleanup criteria for ground water and soil are provided in Section 4.0 below and Tables 1 and 2.

The objectives of on and off-site remediation are to achieve these cleanup criteria as quickly and cost-effectively as possible and return the site to productive use.

4.0 Site Assessment Activities

The following chronologically lists previous site assessment reports and briefly summarizes assessment information. Copies of assessment reports listed below are available on request from Ms. Kristi Lowder of IDEQ.

- **Remedial Investigation, April 1996**

Land & Water Consulting, Inc. drilled four monitoring wells and collected soil samples. Benzene exceeded the cleanup criteria in soil at borings located near the waste oil tank, a well boring located west of the site, and well borings located north and northwest of the site (MW-1, MW-2, MW-3, MW-4). Toluene, ethylbenzene and total xylenes exceeded the cleanup criteria in soil at the well boring located northwest of the site (MW-2). Benzene exceeded the ground water cleanup criteria in the well located near the waste oil tank, a well located west of the site, and wells located north and northwest of the site (MW-1, MW-2, MW-3, MW-4). Toluene exceeded the ground water cleanup criteria in the well located northwest of the site (MW-2).

- **Supplemental Investigation/Quarterly Monitoring Report, Sept. 1997**

Land & Water Consulting, Inc. installed two monitoring wells, sampled five monitoring wells and one domestic well. Benzene exceeded the ground water cleanup criteria in the wells located near the waste oil tank, a well located west of the site, wells located north and northwest of the site, and the library well located northeast of City Hall (MW-1, MW-6, MW-3, MW-4, MW-5, MW-2, LIB). Toluene, ethylbenzene, total xylenes and naphthalene concentrations exceeded the ground water cleanup criteria in the well located nearest the library (MW-5). Free product was identified in the wells located near the waste oil tank (MW-1, MW-6).

- **July 2000 Remedial Investigation & Quarterly Monitoring Report, Oct. 2000**

Land & Water Consulting, Inc. installed four additional monitoring wells and a surface water monitoring point on the Salmon River. Quarterly monitoring consisted of sampling eight monitoring wells, one recovery well, the Century Telephone well, the surface water monitoring point, and indoor air samples in the library basement. Benzene was present above ground water cleanup criteria to the north and northwest of the site (MW-2, MW-4, MW-5, MW-7, MW-8, MW-10). Toluene, ethylbenzene and total xylenes were reported above ground water cleanup criteria in the well located nearest the library (MW-5). Subsurface soil located near the eastbound lane of Main Street, and northwest of the site were slightly stained and had petroleum odors (MW-10). The monitoring well located near the former waste oil tank basin had free product (MW-6).

- **Salmon River Petroleum Seep Site Draft Removal Assessment Report, Nov. 2003**

Ecology & Environment, Inc. was contracted by EPA to conduct a Removal Assessment. Subsurface soil and ground water samples were collected from

15 direct-push boreholes and ground water samples were collected from seven monitoring wells. Benzene, toluene, ethylbenzene and total xylenes and other petroleum hydrocarbon were detected in the on-site and down gradient soil and ground water samples. The area of contamination delineated by these samples includes the former site, the former gasoline and waste oil tank basins, and areas beneath Main Street and continuing north beneath the library and City Hall.

- **MSE Limited Subsurface Assessment, REM and ABCA Report, July 2006**

MSE was retained by IDEQ to collect soil and ground water data to evaluate current subsurface conditions and delineate locations of contamination. Samples were collected from 13 direct-push probe locations, 3 soil vapor well locations and 13 monitoring well locations.

The collected sample data was then entered into the IDEQ Risk Evaluation Manual (REM) model software to evaluate potential human exposure risk. Based on model results, representative concentrations of petroleum hydrocarbons in on-site soil and on and off-site ground water exceeded the IDEQ REM model cleanup criteria for soil and ground water. The IDEQ REM soil and ground water cleanup criteria, is provided on Tables 1 and 2, respectively. The pathways which guide the remediation and determine the cleanup criteria are primarily based on protection of ground water for drinking water purposes and protection of surface water at the Salmon River.

Based on the IDEQ REM cleanup criteria model results, the following ABCA was performed and considered a range of reasonable and proven cleanup alternatives, based on contaminant concentrations, site characteristics, surrounding environment, current and proposed land-use, cleanup goals and associated human health risk and potential exposure pathways. The following six clean up alternatives were identified for the site:

1. No Action
2. Natural Attenuation and Ground Water Monitoring
3. On-site Soil Removal, On and Off-site Oxygen Release Compound Injection, On-site UST Removal and Ground Water Monitoring
4. On-site Soil Removal, Pump-&-Treat Ground Water Remediation System, UST Removal and Ground Water Monitoring
5. On-site Soil Removal, Air Sparge/Soil Vapor Extraction Remediation System, UST Removal and Ground Water Monitoring

6. On-site Soil Removal, Chemical Oxidation Ground Water Remediation System and UST Removal and Ground Water Monitoring

A preliminary screening matrix was utilized to evaluate the six cleanup alternatives based on effectiveness, implementability, cost, operation and maintenance (O&M) and impact to the site and surrounding properties and is summarized on Table 3. Based on results of the preliminary screening matrix, alternatives No. 1, 3, 5 and 6 were retained for further evaluation. The retained alternatives all contain deed restrictions for residential type development.

The four retained alternatives were evaluated against various criteria including costs, overall protectiveness, regulatory compliance, effectiveness and implementability and are summarized on Table 4. Due to lower remediation costs, immediately improved redevelopment potential and meets regulatory compliance as a treatment option, Alternative No. 3 was selected (On-site Soil Removal, on and off-site ORC injection, on-site UST removal and ground water monitoring) as the recommended alternative.

Details regarding selected Alternative No. 3 are summarized in Section 6.0.

5.0 Environmental Conditions Summary

The contamination is generally of a petroleum nature and appears to have been released to the subsurface soil through former/current leaking underground storage tanks (USTs), associated piping and poor facility management practices.

Contaminate concentrations in on-site subsurface soil were reported at elevated levels exceeding the IDEQ cleanup criteria. A site plan showing direct-push probe locations, soil vapor well locations and areas where contaminated soil removal activities will be performed are illustrated on Figure 4.

Monitoring well locations, ground water elevation/flow direction and areas where ground water remediation will be performed are illustrated on Figure 5.

6.0 Discussion of Selected Cleanup Alternative No. 3

On-site UST Removal

As illustrated in Figure 4, one 500-gallon capacity steel UST containing approximately 150 gallons of fuel oil is located approximately six-feet west of the concrete pad (site building foundation). The fuel oil will be pumped from the UST and containerized in 55-gallon drums for transportation off-site to a disposal facility. The UST will then be removed from the subsurface and transported off-site to a recycle/disposal facility.

On-site Soil Removal

On-site soil remediation involves removal of contaminated soil at two areas, as illustrated on Figure 4. The contaminated soil is generally located between approximately eight feet and ten feet below ground surface (bgs). The concrete foundation pad and approximately 650 cubic yards of over-burden soil will be removed allowing access to the contaminated soil. The over-burden soil will be temporarily stockpiled on the nearby property located west and adjacent to the site. Approximately 300 cubic yards of contaminated soil will then be excavated and loaded directly into trucks for transportation off-site to an approved off site facility for treatment/disposal. Up to fifteen confirmation soil samples will be collected following contaminated soil removal activities.

Note that some soil contamination exists near the north and east site boundary(s). On-site excavation in those areas will be limited to the maximum depth required for safe excavation. It is possible that some contamination may have to remain at the bottom and sides of the excavations in these areas to avoid sidewall collapse and potential damage to off-site utility features and roadways.

Excavation activities and project personnel will follow the site Health and Safety Plan (HASP) and OSHA regulations.

Backfill and Compaction Activities

Once the contaminated soil has been removed, SRDA will be responsible for all backfill and compaction activities. Following the completion of backfill and compaction activities by SRDA, on and off-site ground water remediation activities can be initiated.

Ground Water Remediation

Ground water remediation involves injecting Oxygen Release Compound (ORC) into the saturated soil (shallow aquifer) at on and off-site locations to address areas of contamination in the ground water. ORC is composed of magnesium peroxide that gradually releases oxygen when in contact with water and would provide a source of oxygen to promote degradation of contaminants. The ORC will be injected into the subsurface in a series of on and off-site injection locations. Areas of ground water contamination and ORC injection locations are illustrated on Figure 5.

A second ORC injection event will be performed approximately six months following first ORC application and will address remaining areas of contamination.

Ground Water Monitoring

Verification of remediation performance will be provided through a ground water monitoring program. Ground water will be monitored on a quarterly basis (every three months) for a minimum period of three years to document ground water conditions. If cleanup criteria are shown to have been achieved in less time the monitoring period may be reduced. Ground water samples will be collected from monitoring wells MW2 through MW7 and MW10 through MW13.

Monitoring wells will be sampled following the procedures developed and used in the Limited Subsurface Assessment, REM and ABCA Report. Ground water samples will be submitted to Alchem Laboratories of Boise, Idaho for analysis of

benzene, toluene, ethylbenzene, total xylenes, naphthalene (BTEXN), methyl-tert-butyl-ether (MTBE) and 1,2-Dichloroethane (EDC) according to EPA Method 8260.

The monitoring reports will include ground water sample analytical results, ground water parameters, a brief discussion of field activities, results and figures illustrating site location and ground water flow direction. The results of the each monitoring event will be compared to previous monitoring results and any significant changes will be noted and will also be compared to the IDEQ cleanup criteria. Additional ORC injection events or other actions may be needed, based on the results of the ground water monitoring. The ground water monitoring reports will be submitted to SRDA and IDEQ agencies.

7.0 Program Management

The program manager is the principal technical person responsible for the day-to-day operation of the project. The project's professional geologist/engineer will be responsible for remedial activities including reports and contacts with the SRDA.

7.1 Reporting and Project Schedule

Once the remediation project begins, SRDA will be notified in advance of any on-site activities. The expected schedule for the project is related to the availability of equipment, weather conditions, the actual amount of contamination found, and the related remediation time. The time frames for the currently planned remediation activities are outlined below:

- February to March 2007 – Beginning of the 30-day public comment period
- March-April 2007- Finalize Remediation Workplan
- April 2007 – Initiate ground water monitoring, which will continue for a minimum (if needed) of three years to confirm ground water conditions
- April/May 2007 – Perform soil removal action activities

- May 2007 – Perform the first ORC injection event
- November 2007 – Perform the second ORC injection event

The expected time to complete the remedial action activities including final remediation report preparation and submission to SRDA and IDEQ is approximately six to ten months (plus additional time to complete the ground water monitoring events) from the notice to proceed date.

7.2 Project Organization

The following key personnel and companies are currently proposed for this project. In addition, the program manager may need to add or delete project organization members based on the needs of the project and related issues.

Owner/Owner's Representative:

SRDA

Wayne Talmadge, Contract and Project Representative

Regulatory Oversight and/or Questions:

IDEQ

Bruce Wicherski

Environmental Manager:

MSE

James Kuchera, P.G., Environmental Program Manager

Project personnel: Technicians, scientists, engineers, etc.

Health and Safety:

MSE

Jared Potts, E.I.T. - Site Safety Officer

Analytical Laboratory:

Alchem Laboratories
Project Manager: Dale Myres

Subcontractors:

Dahle Construction – Excavation Contractor
Direct-Push Services LLC – ORC Injection Contractor

8.0 Site Access and Security

The site will be accessed from South Terrace Street, Water Street and the alley. A safety fence will be installed and maintained throughout removal action activities to limit public access. Only authorized personnel will be allowed on-site. As site conditions change, additional security measures may be implemented as appropriate. These could include:

- Local security when equipment is on site or when excavations are open
- Signs
- Lighting
- Other measures as appropriate

As remediation progresses, site security will change based on the need to protect the public and equipment

8.1 Site Preparations

The site surface includes gravel, weeds and the concrete foundation pad. At appropriate intervals additional equipment may be brought to the site as needed. This could include:

- Personnel Hygiene: Portable toilet
- Generator for security lighting
- Cargo container for temporary storage of: drums, plastic, stakes, supplies, expendables, etc.

- Additional site preparation related to each of the remedial activities is described in subsequent sections of this VRWP

8.2 Utility Markouts

Public utility mark-outs will be requested prior to removal action activities. The HASP for the site will include emergency procedures and call numbers in the event of an emergency.

8.3 Work Area Controls

Work area controls will include the establishment of specific work zones: Exclusion Zone, Contamination Reduction Zone, and a Support Zone.

An Exclusion Zone will be established around the immediate vicinity of each remediation work area. Only qualified personnel and designated equipment to be used in the removal action will be permitted to enter the exclusion zone.

The Contamination Reduction Zone will be immediately adjacent to the Exclusion Zone. Personnel and equipment passing through this zone will follow specific decontamination procedures to avoid spreading contaminants outside the immediate remediation area.

The Support Zone will consist of the area outside of the Exclusion and Contamination Reduction Zones. In this case it is the remainder of the fenced area of the site.

9.0 Protocols and Procedures

Activities presented in this VRWP will be performed in accordance with IDEQ, Idaho Department of Water Resources (IDWR) permitting requirements. MSE and its subcontractors will follow applicable environmental health and safety standards.

9.1 Health and Safety Plan

The project manager and associated personnel have advanced health and safety training to include 40-hour Hazardous Waste Site Operations and 8-hour Refresher courses, as specified in OSHA, 29 CFR 1910.120. A HASP will be developed and approved by IDEQ and will become part of the VRWP.

9.2 Equipment Decontamination

The decontamination procedures outlined in the following sections involve both field-testing equipment for analysis/safety and heavy equipment for excavating and grading. The portion of the excavating equipment, coming in contact with contaminated soil, will be decontaminated by scrubbing with Alquinox, steam cleaning or broom cleaning. Special precaution will be taken (as indicated in the HASP) for containing and preventing the runoff or seepage of liquid products from the cleaning process (if any).

9.3 Field Sampling Equipment

Field equipment will be properly maintained to prevent contamination or physical failure. Field analytical equipment will be calibrated with laboratory standards according to the manufacturer's or field method's specifications. Field sampling equipment that is not disposable will be decontaminated by sequentially cleaning with detergent, solvents, and water according to the sampling protocol.

9.4 Personnel Protective Equipment (PPE)

Based on contaminant type and concentrations, field PPE will include normal clothing, standard protection and no respirator protection (Level D protection).

9.5 Documentation

The appropriate field supervisors and personnel that document each day's activities will keep field note. Logs will be prepared to document use of sampling and PPE equipment that will be filled in by each user at the time of use. It is not intended that the activities be photographically recorded in real time, but still

photos and videotaping may also document the procedures and progress of the project.

10.0 Quality Assurance Project Plan

A Quality Assurance Project Plan (QAPP), describing the measures used to ensure that defensible and quality data are collected and reported for this project will be finalized prior to field activities. Samples will be collected and laboratory analyzed to detection concentration levels equal to or below applicable cleanup standards for future land use. The QAPP will include the following:

- Data quality objectives
- Identification of project personnel, responsibilities and applicable training
- Identification of laboratory
- Identification of analysis methods and detection limits
- Description of facilities and equipment to be used on this project
- Sample preparation, handling, tracking and shipping specifications
- Quality Assurance/Quality Control sample type and frequency
- Maintenance of records and documentation

The QAPP will be reviewed and approved by IDEQ and the EPA prior to the initiation of field activities and will become part of the VRWP.

11.0 Final Remediation Report

As stated in the Voluntary Cleanup Agreement for this site the "Volunteer shall submit to the IDEQ a final remediation report summarizing the following actions taken in the process of remediation in accordance with the VRWP:

- Executive Summary
- Remedial Activities Completed
- Problems Encountered and Their Resolution
- Variations from the Initial VRWP (if any)
- Excavated Materials
- ORC Injection Activities
- Post-Remediation Effectiveness

- Remediation Standards Applied to Remedial Actions
- Findings and Conclusions Regarding Completeness of Work
- Applicable Appendices

Maps and Drawings

- Site Location Map
- Site Map
- Contaminated Soil Removal Map
- ORC Injection locations

The Report will be submitted for IDEQ review and approval that the remedial activities have been completed. Upon approval of the Remediation Completion Report by IDEQ a Certificate of Completion will be issued to SRDA.

ATTACHMENTS:

Table 1	Representative Soil Concentrations and REM Cleanup Criteria
Table 2	Representative Ground Water Concentrations and REM Cleanup Criteria
Table 3	ABCA Preliminary Screening Matrix
Table 4	ABCA Comparison of Removal Alternatives
Figure 1	Site Location Map
Figure 2	Site Vicinity Map
Figure 3	Domestic Well Location Map
Figure 4	Area Plan with Probe Locations, Soil Vapor Wells and Hydrocarbon Soil Contamination Perimeter
Figure 5	Ground Water Hydrocarbon Plume, Flow Direction and ORC Injection Location Map
Appendix 1	Domestic Well List

Table 1
Representative Soil Concentrations and REM Soil Cleanup Criteria

Salmon River Development Agency
205 Main Street
Salmon, Idaho

Table 1 - shows laboratory detected COCs only
IDTLs, REM and lab results are reported in micrograms per kilogram (ug/kg)

	Chemicals of Concern	Benzene	Toluene	Ethyl-benzene	Total Xylenes	Napthalene	Acenaphthylene	Fluoranthene	Fluorene	Dibenzofuran	Phenanthrene	Pyrene
	Representative Soil Concentration:	8,293	34,248	12,400	76,700	5,210	36	35	38	61	189	45
	REM IDTLs - Soil	17.8	4,890	10,200	1,670	1,140	78,000	364,00	548,000	6,100	79,000	359,000
REM Cleanup Criteria	*REM Surface Soil Concentration for Inhalation of Vapor/Particles, Dermal Contact and Accidental Ingestion for a Construction Worker*	16,300	4,930,000	941,000	107,000	17,500	6,580,000	3,830,000	2,570,000	238,000	3,290,000	2,950,000
	REM Subsurface Soil Concentration Directly Beneath the Source Protective GW at POE	**32.3**	**8,880**	18,600	270,000	9,390	142,000	661,000	99,700	11,100	144,000	653,000
	REM Subsurface Soil Concentration Directly Beneath the Source Protective of SW	**15.3**	119,000	162,000	NSWSTD	NSWSTD	NSWSTD	935,000	611,000	NSWSTD	NSWSTD	3,940,000

Notes:
COC - Chemicals of concern
REM - Risk Evaluation Manual.
IDTLs - Initial Default Target Levels.
GW - Ground water
SW - Surface water
POE - Point of exposure @ MW-11
###.# Highlighted value indicates that the representative soil concentration exceeds the calculated REM-2 limit
NSWSTD - No surface water standard

Table 2
Representative Groundwater Concentrations and REM Cleanup Criteria

Salmon River Development Agency
205 Main Street
Salmon, Idaho

Table 2 - shows laboratory detected COCs only
IDTLs, REM and lab results are reported in micrograms per liter (ug/L)

	Chemicals of Concern	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene	MTBE	1,2-Dichloroethane	Acenaphthylene	Bis (2-Ethylhexyl)-phthalate
	Representative Groundwater Concentration:	769	2,475	777	4,217	1,021	32.8	4.2	2.2	1.3
	REM Initial Default Target Levels - Groundwater	5	1,000	700	4,340	209	16.9	5	626	6
REM Cleanup Criteria	**On-site* REM RATL-2 (Groundwater) Indoor Inhalation of Vapor Emissions*	2,420	684,000	62,900	6,950	2,630	1,530,000	1,920	NA	174,000,000
	REM Allowable GW Concentration Protective of POE (at MW-11)	**11.2**	**2,240**	1,570	22,400	**467**	37.9	11.2	1,400	13.4
	REM Allowable GW Concentration Protective of Surface Water (at source)	**5.28**	29,900	13,700	NSWSTD	NSWSTD	NSWSTD	**1.67**	NSWSTD	7.93
	REM Allowable GW Concentration Protective of SW (at MW-11)	**3.39**	19,200	8,770	NSWSTD	NSWSTD	NSWSTD	**1.07**	NSWSTD	5.09

Table 2 continued

	Chemicals of Concern	Dibenzofuran	Di-n-butl Phthalate	2,4-Dimethylphenol	Fluorene	3 & 4 - Methylphenol	Phenanthrene	Phenol	Pyrene
	Representative Groundwater Concentration	2.3	1.2	2.1	4.2	4.4	8.0	1.6	4.3
	REM Initial Default Target Levels - Groundwater	41.7	1,040	209	417	521	313	3,130	313
REM Cleanup Criteria	**On-site* REM RATL-2 (Groundwater) Indoor Inhalation of Vapor Emissions*	38,800	63,000,000	9,630,000	NA	5,800,000	NA	676,000,000	3,210,000
	REM Allowable GW Concentration Protective of POE (at MW-11)	93.4	2,340	467	934	117	701	7,010	701
	REM Allowable GW Concentration Protective of Surface Water (at source)	NSWSTD	11,900	NSWSTD	5,730	NSWSTD	NSWSTD	92,500	4,230
	REM Allowable GW Concentration Protective of SW	NSWSTD	7,630	NSWSTD	3,680	NSWSTD	NSWSTD	59,400	2,710

Notes:
REM - Risk Evaluation Manual.
IDTLs - Initial Default Target Levels.
###.# Highlighted value indicates that the representative groundwater concentration exceeds the minim calculated REM-2 limit.
GW - Ground water
SW - Surface water
POC - Point of compliance (gw and sw is @ MW-11)
POE - Point of exposure (gw is @ MW-11 and SW is nearest edge of Salmon River)
NSWSTD - No surface water standard
NA - Not applicable

Table 3
ABCA Preliminary Screening Matrix

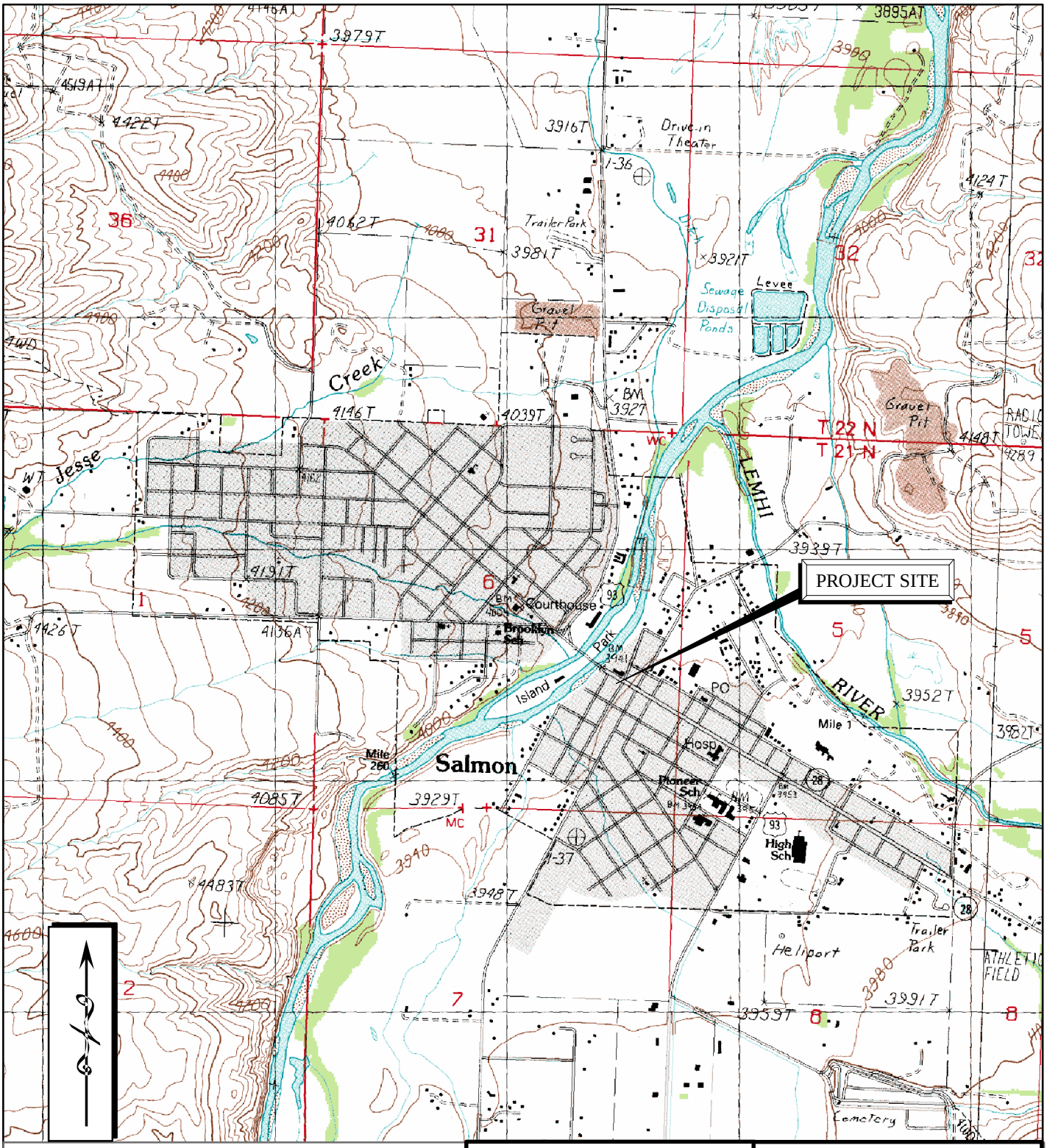
Salmon River Development Agency
205 Main Street
Salmon, Idaho

Technology Class	Process Option	Description	Effective–ness	Implemen t-ability	Cost	O&M	Land Impact	Pros	Cons	Retained?
No Action										
Alt. 1 - No action	No action	Leave "as is"	0	0	0	None	Site development limited	No cost, easy	No risk reduction, limited site use and deed restriction for residential development	**Yes**
Treatment Alternatives										
Alt. 2 – Natural attenuation and groundwater monitoring	Natural attenuation of petroleum hydrocarbons	No engineering controls or accelerated treatment processes	Low	Very low	Low	Low–Monitor groundwater for six years (12 semi-annual monitoring events)	Site development limited	Simple, groundwater monitoring only	Limited risk reduction and treatment overtime, limits on-site land use and deed restriction for residential development	No
Alt. 3 – On-site soil removal, on and off-site ORC injection, on-site UST removal and groundwater monitoring	Excavate contaminated soil and insitu biological treatment	Inject ORC slurry into subsurface to oxygenate groundwater and saturated soil	Medium	Low	Medium	Low– Monitor groundwater for three years (12 quarterly events)	Low	Insitu petroleum hydrocarbon treatment, no system installation and/or monitoring, no site electricity, no off-site disposal	May need additional injection of ORC and deed restriction for residential development	**Yes**
Alt. 4 – On-site soil removal, pump and treat groundwater (on and off-site), on-site UST removal and groundwater monitoring	Excavate contaminated soil, exsitu treatment, engineering controls and system installation	Pump groundwater to on-site treatment system (wells, pumps, piping, electrical)	High	High	High	High–monitor treatment system for three years and monitor groundwater for three years (12 quarterly events)	High	Active petroleum hydrocarbon treatment of groundwater, hydraulic control of hydrocarbon plume	No soil treatment, water disposal, system installation and monitoring, electricity required, clean up duration, less effective in winter and deed restriction for residential development	No
Alt. 5 – On-site soil removal, air sparge/SVE (on and off-site), UST removal and groundwater monitoring	Excavate contaminated soil, insitu treatment, engineering controls and system installation	Inject air into groundwater and strip off soil vapor phase petroleum hydrocarbons	High	High	Medium - high	High—monitor treatment system for two years and monitor groundwater for three years (12 quarterly events)	High	Active petroleum hydrocarbon treatment of soil and groundwater. No off-site disposal.	System installation and monitoring, requires electricity and air permitting/treatment and deed restriction for residential development	**Yes**
Alt. 6 –On-site soil removal, chemical oxidation, UST removal and groundwater monitoring	Excavate contaminated soil, insitu treatment, engineering controls and system installation	Insitu ozone groundwater sparging to remove/treat petroleum hydrocarbons	High	High	High	Medium to high – monitor treatment system for eighteen months and monitor groundwater for three years (12 quarterly events)	High	Rapid degradation of petroleum hydrocarbons in groundwater and saturated soil. No off-site disposal.	System installation and monitoring, no soil treatment, requires electricity and deed restriction for residential development	**Yes**

Table 4
ABCA Comparison of Removal Alternatives

Salmon River Development Agency
205 Main Street
Salmon, Idaho

Assessment Criteria	Alternative 1 No action	Alternative 3 Soil Removal, on and off-site ORC injection, UST removal and groundwater monitoring	Alternative 5 Soil removal, on and off-site air sparge/SVE soil and groundwater treatment, UST removal and groundwater monitoring	Alternative 6 Soil removal, chemical oxidation remediation system, UST removal and groundwater monitoring
Overall Protectiveness of Public Health, Safety and Welfare	No protection	Protects human receptors and mitigates exposure.	Protects human receptors and mitigates exposure	Protects human receptors and mitigates exposure
Environmental Protectiveness	No protection	Protects ecological/human receptors and provides insitu contaminant treatment.	Protects ecological/human receptors and provides active insitu contaminant treatment	Protects ecological/human receptors and provides active insitu contaminant treatment
Regulatory compliance	Does not comply	Complies	Complies	Complies
Long Term Effectiveness and Permanence	None	Source removal will provide long-term on-site permanence. May need additional ORC application for long-term off-site permanence. No system installation required. Groundwater monitoring required.	Provides good long-term permanence and is effective treatment to soil and groundwater. System installation and system/groundwater monitoring required	Provides good long-term permanence and is effective treatment to groundwater and saturated soil. System installation and system/groundwater monitoring required
Reduction of Toxicity, Mobility and Volume	None	Reduction by source removal, good reduction of toxicity volumes in groundwater, minimizing potential contaminant transport. Limited effectiveness in unsaturated soils.	Good reduction of toxicity volumes in soil and groundwater, minimizing potential contaminant transport.	Aggressive reduction of toxicity volumes in groundwater and saturated soil, minimizing potential contaminant transport.
Short-Term Effectiveness	None	On-site immediate effectiveness in reducing risk from groundwater. Medium to high short-term effectiveness to on and off-site groundwater.	Low to medium short-term effectiveness.	Medium to high short-term effectiveness.
Implementability	Not applicable	Easily implemented and technically and administratively feasible.	On-site implementation more difficult involving trench excavation and well installation. Off-site implementation more difficult due to trench excavation and well installation in Main Street.	On-site implementation more difficult involving trench excavation and well installation. Off-site implementation more difficult due to trench excavation and well installation in Main Street. No soil treatment.
DEQ and Community Acceptance	Not acceptable	Acceptable	Acceptable	Acceptable
Cost – On-site	$0	$71,000	160,000	175,000
Cost – Off-site	$0	$16,500	65,000	50,000



REFERENCE: U.S.G.S. 7.5 MINUTE QUADRANGLE, SALMON, IDAHO 1986

SCALE

0 0.125 0.25 0.5 0.75 1 Miles

0 500 1,000 2,000 3,000 4,000 Feet

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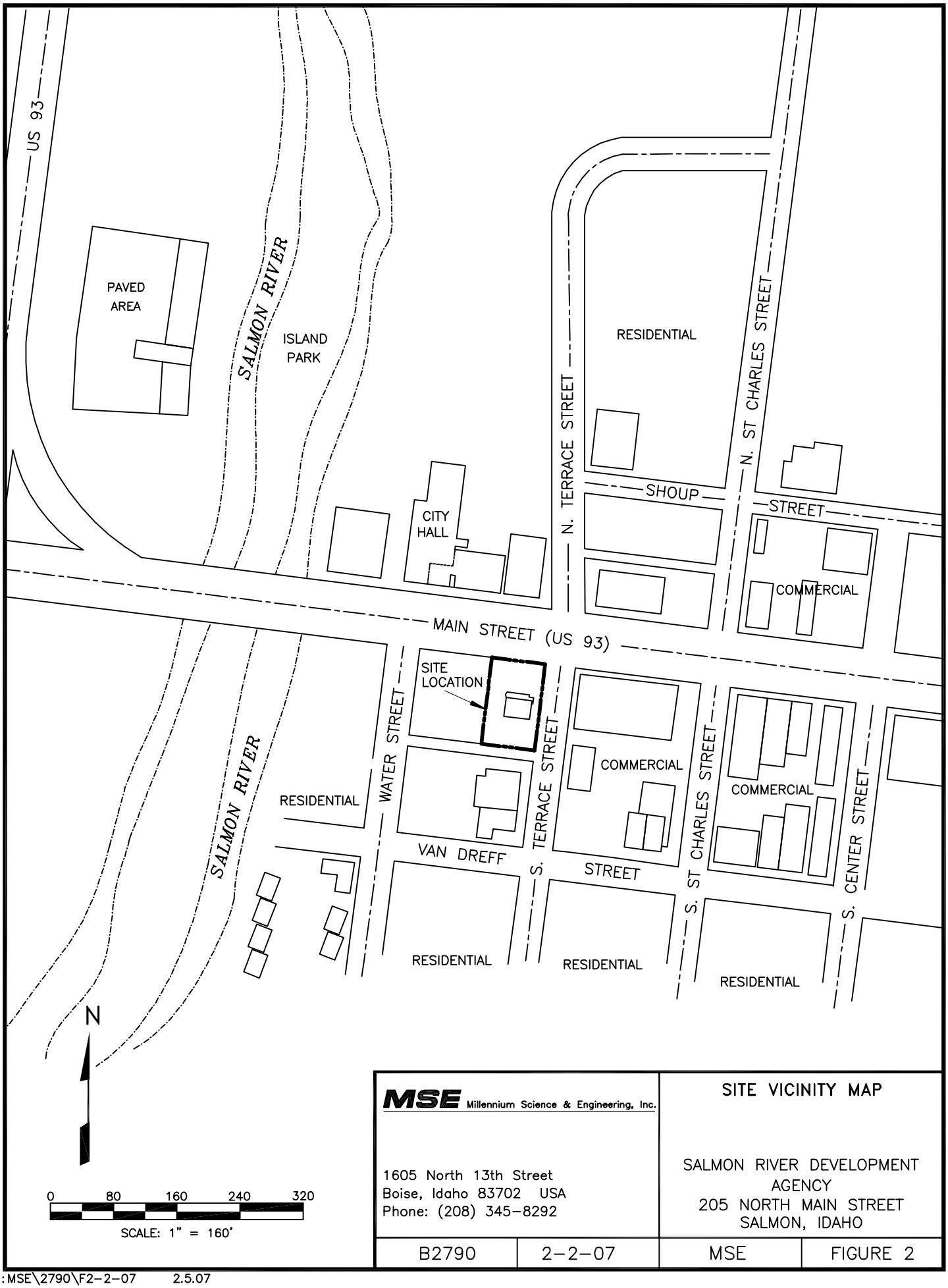
SITE LOCATION MAP

SALMON RIVER DEVELOPMENT AGENCY
205 NORTH MAIN STREET
SALMON, IDAHO

B2790	2-2-07	MSE	FIGURE 1

:MSE\2790\B2790_F1.mxd 2.5.07



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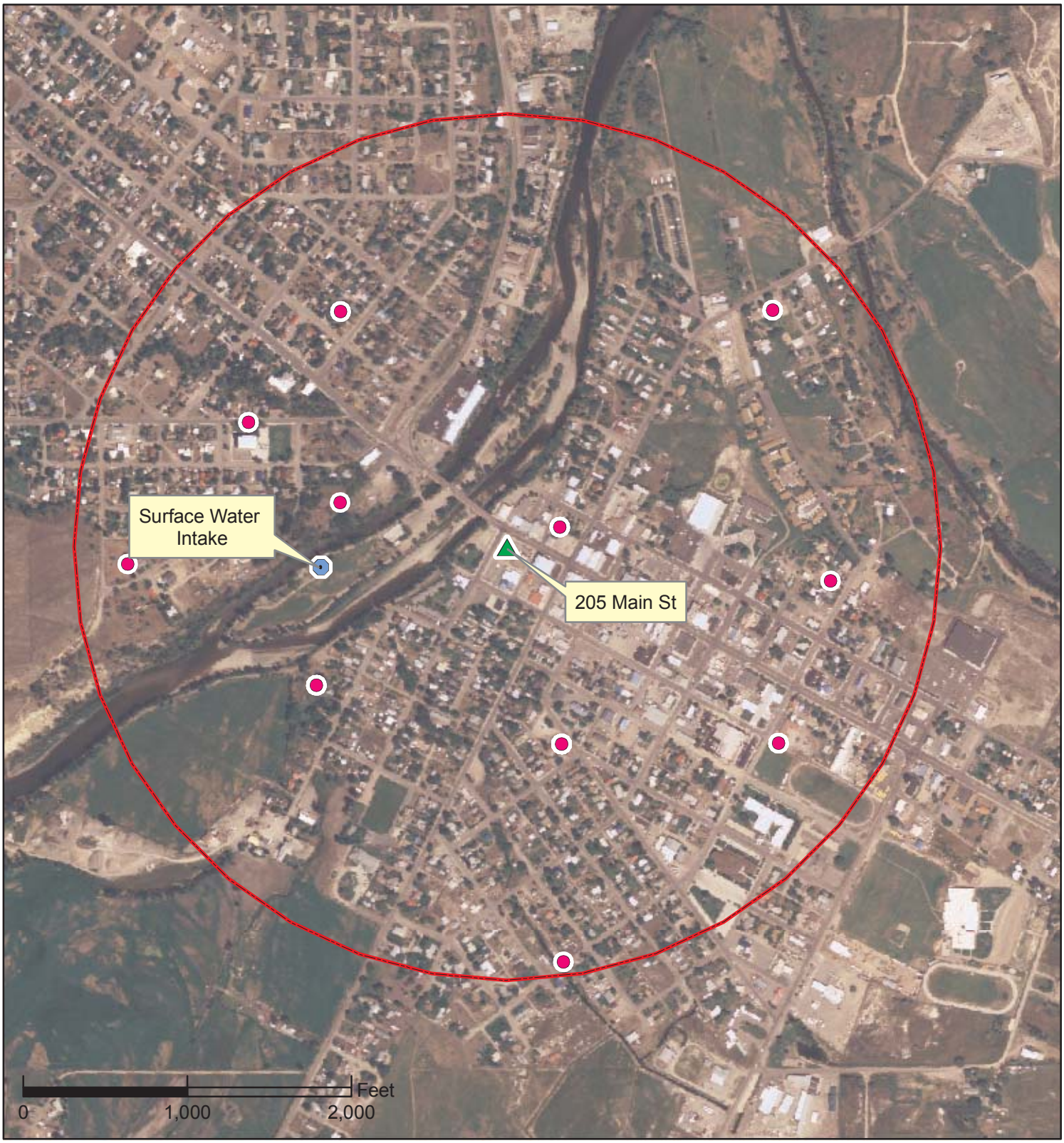
SITE VICINITY MAP

SALMON RIVER DEVELOPMENT AGENCY
205 NORTH MAIN STREET
SALMON, IDAHO

B2790	2-2-07	MSE	FIGURE 2

:MSE\2790\F2-2-07 2.5.07



Legend

- Domestic Wells - IDWR
- Public Water Systems
- 205 Main St
- 1/2 Mile Buffer

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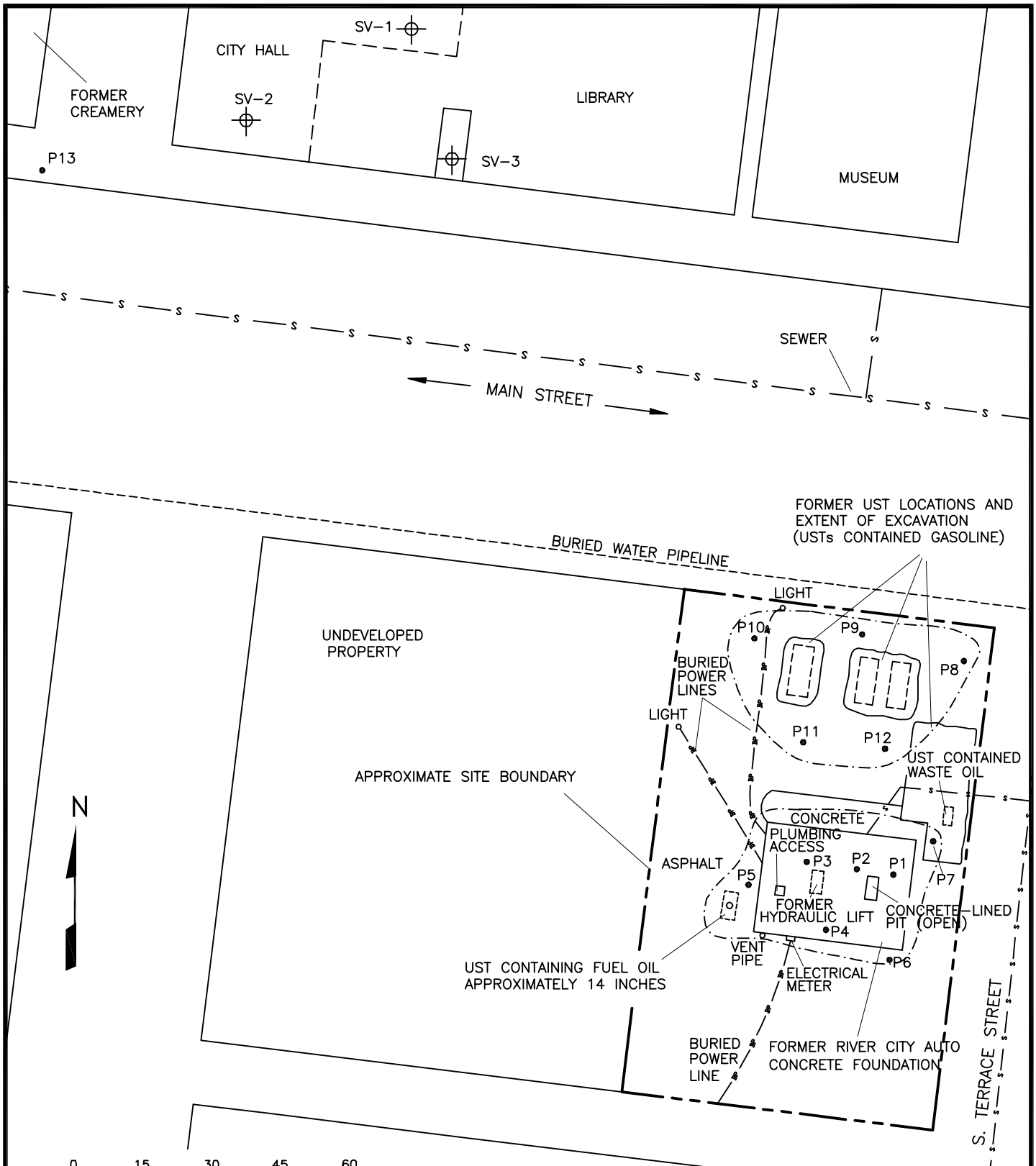
DOMESTIC WELL LOCATION MAP

(WITHIN 1/2 MILE RADIUS OF SITE)

SALMON RIVER DEVELOPMENT AGENCY
205 N. MAIN ST.
SALMON, IDAHO

B2790	02-06-07	MSE	FIGURE 3



LEGEND	
● P1	PROBE LOCATIONS
SV-1 ⊕	SOIL VAPOR WELL
	APPROXIMATE PERIMETER OF SOIL HYDROCARBON CONTAMINATION (8-10 ft. BGS)

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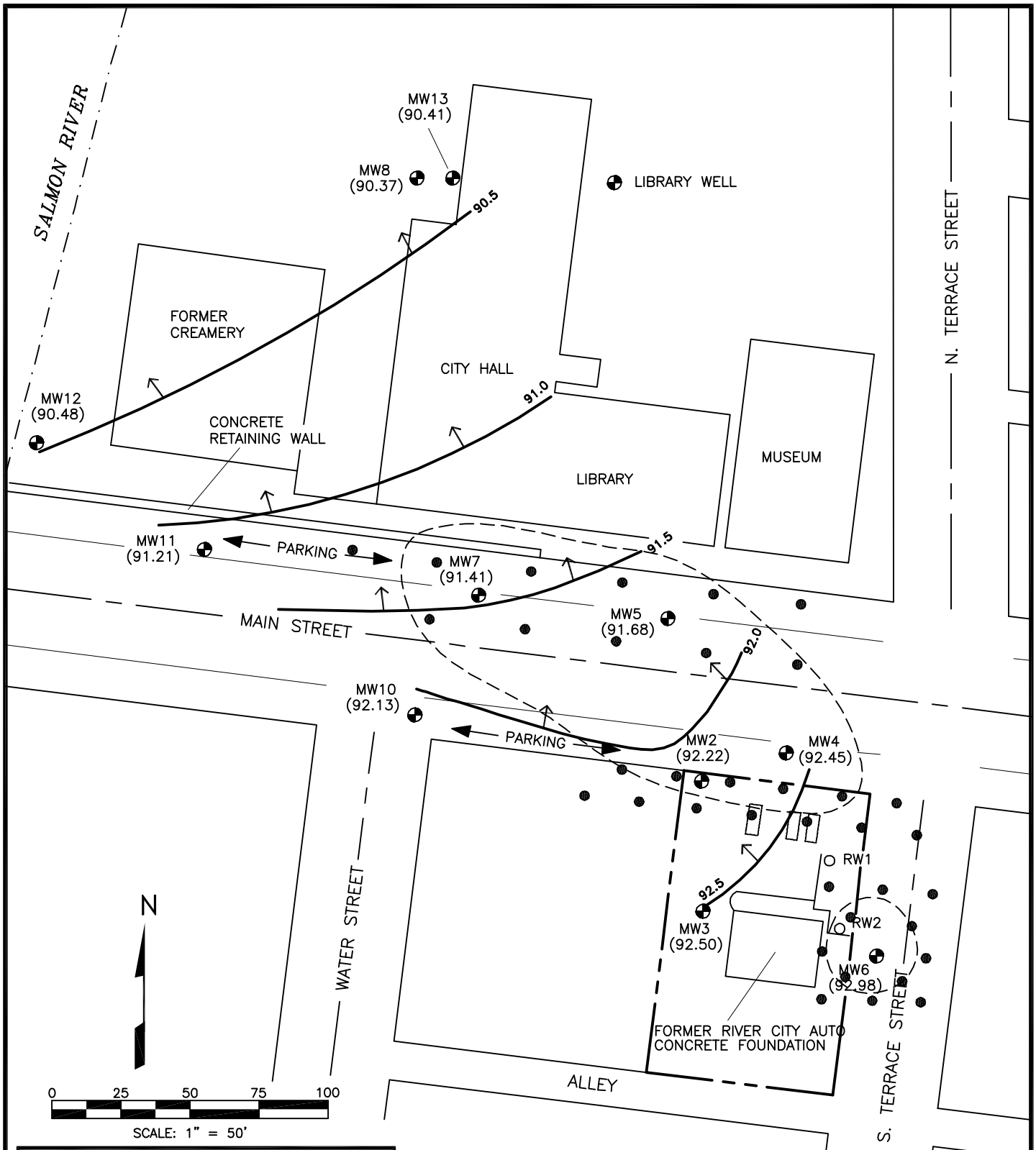
AREA PLAN WITH PROBE LOCATIONS, SOIL VAPOR WELLS, AND HYDROCARBON SOIL CONTAMINATION PERIMETERS

SALMON RIVER DEVELOPMENT AGENCY
205 NORTH MAIN STREET
SALMON, IDAHO

B2790	2-2-07	MSE	FIGURE 4

:MSE\2790\F4-2-07 2.7.07



LEGEND

●	ORC INJECTION LOCATIONS (36)
⊕	MONITORING WELL LOCATIONS
(92.22)	GROUNDWATER ELEVATION
	APPROXIMATE PERIMETER OF GROUNDWATER HYDROCARBON PLUMES
	GROUNDWATER CONTOUR
↑	INTERPRETED DIRECTION OF GROUNDWATER FLOW

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GROUNDWATER EQUIPOTENTIAL CONTOUR INTERVAL, HYDROCARBON PLUME, AND ORC INJECTION LOCATION MAP

April 29, 2006

SALMON RIVER DEVELOPMENT AGENCY
205 NORTH MAIN STREET
SALMON, IDAHO

B2790	2-2-07	MSE	FIGURE 5

:MSE\2790\F5-2-07 2.7.07

APPENDIX 1

Domestic Well List - 1/2 Mile Radius of Site

Salmon River Development Agency
205 Main Street
Salmon, Idaho

WELL ID	PERMIT ID	OWNER	Driller	County	Township	Range	Sec	Well Address	Well Use	Static Water	Date Const.
286476	741091	H DENNIS HAVENS	HARBER DRILLING CO	LEMHI	21N	22E	6	MAIN STREET	Domestic-Single Residence	10	Nov 4 1993
286577	741188	STEELE MEMORIAL HOSPITAL	HARBER DRILLING CO	LEMHI	21N	22E	5	811 MAIN STREET	Domestic-Single Residence	12	Mar 27 1995
286585	741195	HELEN L VAN NESS	TARGET DRILLING INC	LEMHI	21N	22E	6	515 S TERRACE	Domestic-Single Residence	7	Apr 27 1995
286586	741196	HELEN L VAN NESS	TARGET DRILLING INC	LEMHI	21N	22E	6	515 S TERRACE	Domestic-Single Residence	7	Apr 27 1995
286662	741271	GENE ROCKHAM	DAHLE WELL DRILLING	LEMHI	21N	22E	6	402 RIVER ST	Domestic-Single Residence	4	May 18 1996
286679	741286	KENNETH M ALLEN	DAHLE WELL DRILLING	LEMHI	21N	22E	6	315 S ST CHARLES	Domestic-Single Residence	10	Jul 21 1996
286680	741287	RHONDA ZIEGLER	HARBER DRILLING CO	LEMHI	21N	22E	5	407 1/2 N ST CHARLES	Domestic-Single Residence	6	Jul 31 1996
286685	741292	U S BANK OF IDAHO	HARBER DRILLING CO	LEMHI	21N	22E	6	501 MAIN ST	Domestic-Single Residence	16	Sep 2 1996
286813	741409	DAVID LAWSON	DAHLE WELL DRILLING	LEMHI	21N	22E	6	501 S CHALLIS	Domestic-Single Residence	6	Feb 28 1999
286833	740680	BOB GIBBS	DAHLE WELL DRILLING	LEMHI	21N	22E	5	SOUTH CHALLIS ST	Domestic-Single Residence	9	Jun 2 1996
286850	740696	JOHN BRYANT	HARBER DRILLING CO	LEMHI	21N	22E	5	SHOUP ST	Domestic-Single Residence	14	Apr 15 1997
286956	740800	FENTON YOWELL	HARBER DRILLING CO	LEMHI	21N	22E	6		Domestic-Single Residence	38	Mar 31 1989
286965	740809	RICHARD YOUNG	HARBER DRILLING CO	LEMHI	21N	22E	6		Domestic-Single Residence	78	Nov 28 1988
286982	740826	LOREN ARFMANN	HARBER DRILLING CO	LEMHI	21N	22E	6		Domestic-Single Residence	0	
286983	740827	EDWARD C MATTHES	HARBER DRILLING CO	LEMHI	21N	22E	6		Domestic-Single Residence	0	
286985	740829	HELEN NIELSEN	HARBER DRILLING CO	LEMHI	21N	22E	6		Domestic-Single Residence	20	Jun 10 1989
287018	740862	ED FURNESS	HARBER DRILLING CO	LEMHI	21N	22E	6		Domestic-Single Residence	40	Dec 30 1989
287021	740865	TOM CHAFFIN	HARBER DRILLING CO	LEMHI	21N	22E	7		Domestic-Single Residence	8	Jan 2 1990
287043	740887	D H BROWN	HARBER DRILLING CO	LEMHI	21N	22E	6		Domestic-Single Residence	24	Apr 20 1990
287067	740911	GRANT DAVIS	DAHLE WELL DRILLING	LEMHI	21N	22E	6	406 RIVER ST	Domestic-Single Residence	4	Aug 11 1990
287069	740913	NELSON M MC GEARY	HARBER DRILLING CO	LEMHI	21N	22E	7	1009 S DAISY ST	Domestic-Single Residence	8	Sep 12 1990
287076	740920	WILLIAM E GOODMAN	HARBER DRILLING CO	LEMHI	21N	22E	6	601 LENA, MC PHERSON & LENA ST	Domestic-Single Residence	10	Sep 6 1990
287088	740932	DONALD W MOSHER	HARBER DRILLING CO	LEMHI	21N	22E	6	600 VAN DREFF	Domestic-Single Residence	13	Dec 5 1990
287106	740948	ROGER ACKERMAN	DAHLE WELL DRILLING	LEMHI	21N	22E	5	521 CONFEDERATE DR	Domestic-Single Residence	4	Mar 15 1991
287110	740952	DON VIAL	DAHLE WELL DRILLING	LEMHI	21N	22E	6	521 HOPE AVE	Domestic-Single Residence	10	Apr 7 1991
287136	740978	RIVERS EDGE COMM. BLDING	HARBER DRILLING CO	LEMHI	21N	22E	6	401 MAIN ST	Domestic-Single Residence	10	Oct 16 1991
287179	741021	STEVE ADAMS	DAHLE WELL DRILLING	LEMHI	21N	22E	6	501 S ST CHARLES	Domestic-Single Residence	0	
287180	741022	LARRY PHILLIPS	HARBER DRILLING CO	LEMHI	21N	22E	6	608 CHURCH ST	Domestic-Single Residence	8	Aug 20 1992
287486	740550	JOSEPH STROZZI	HARBER DRILLING CO	LEMHI	21N	22E	6	307 S RIVER	Domestic-Single Residence	7	Sep 7 1990
287567	740631	BEN SUAREZ	DAHLE WELL DRILLING	LEMHI	21N	22E	5	EAST MAIN STREET	Domestic-Single Residence	7	May 15 1994
408498	838115	CHAD LEWIS	HARBER DRILLING CO	LEMHI	21N	22E	5	422 CONFEDERATE DRIVE	Domestic-Single Residence	4	Jan 19 2006